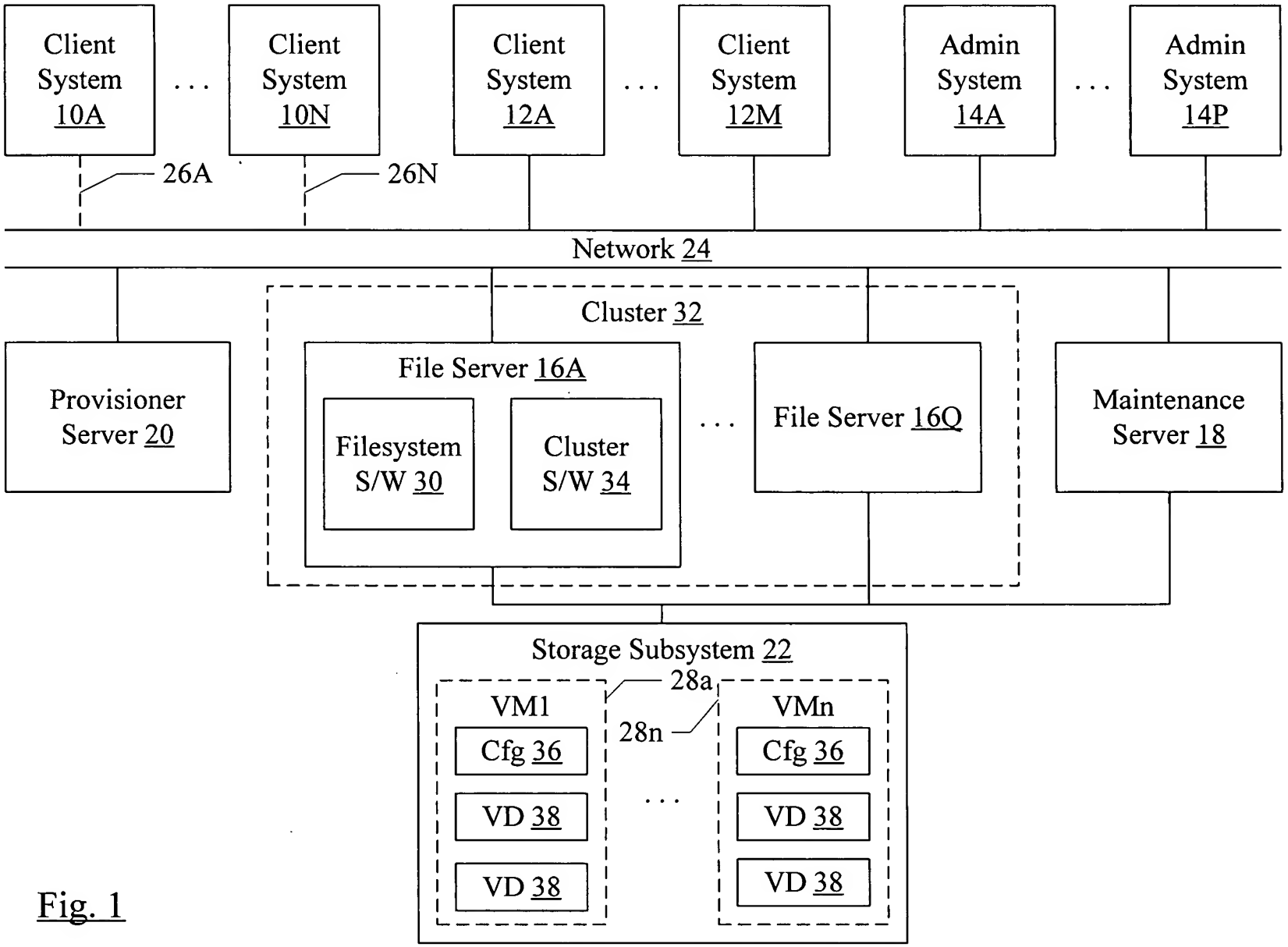
Client System 10A
Client System 10N
Client System 12A
Client System 12M
Admin System 14A
Admin System 14P
26A
26N
Network 24
Cluster 32
Provisioner Server 20
File Server 16A
Filesystem S/W 30
Cluster S/W 34
File Server 16Q
Maintenance Server 18
Storage Subsystem 22
28a
28n
VM1
VMn
Cfg 36
VD 38

Fig. 1

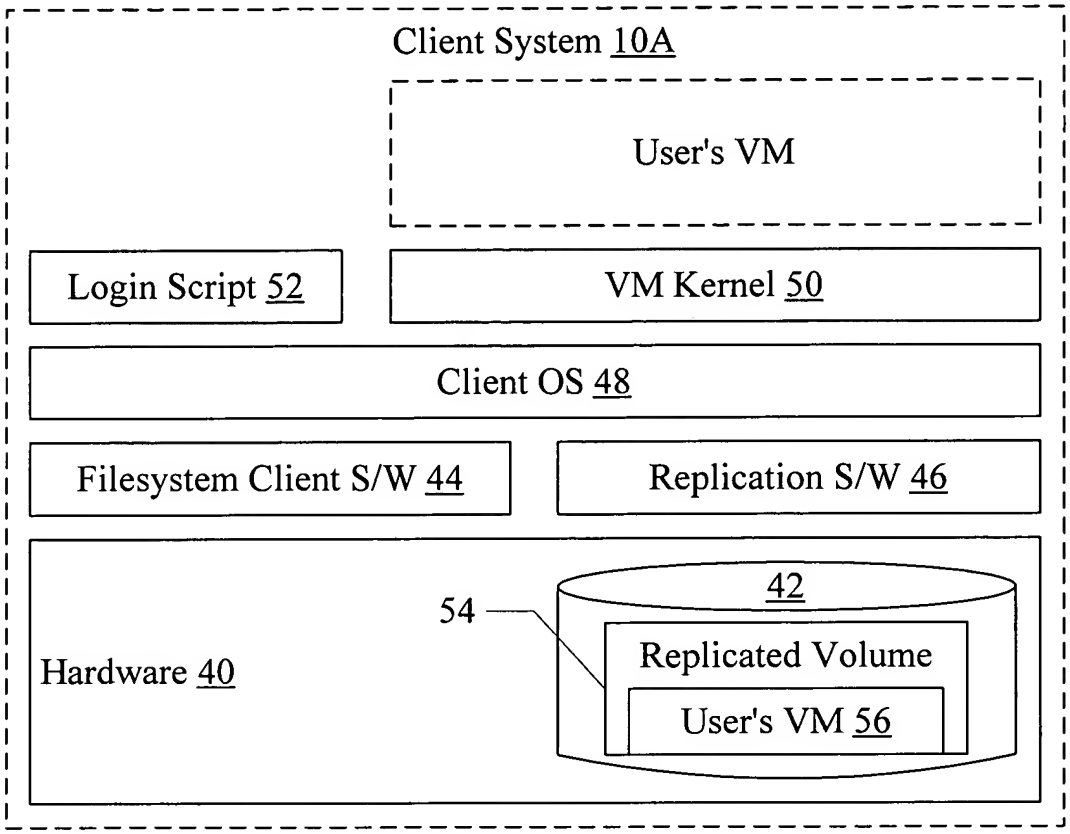
Client System 10A
User's VM
Login Script 52
VM Kernel 50
Client OS 48
Filesystem Client S/W 44
Replication S/W 46
Hardware 40
54
42
Replicated Volume
User's VM 56

Fig. 2

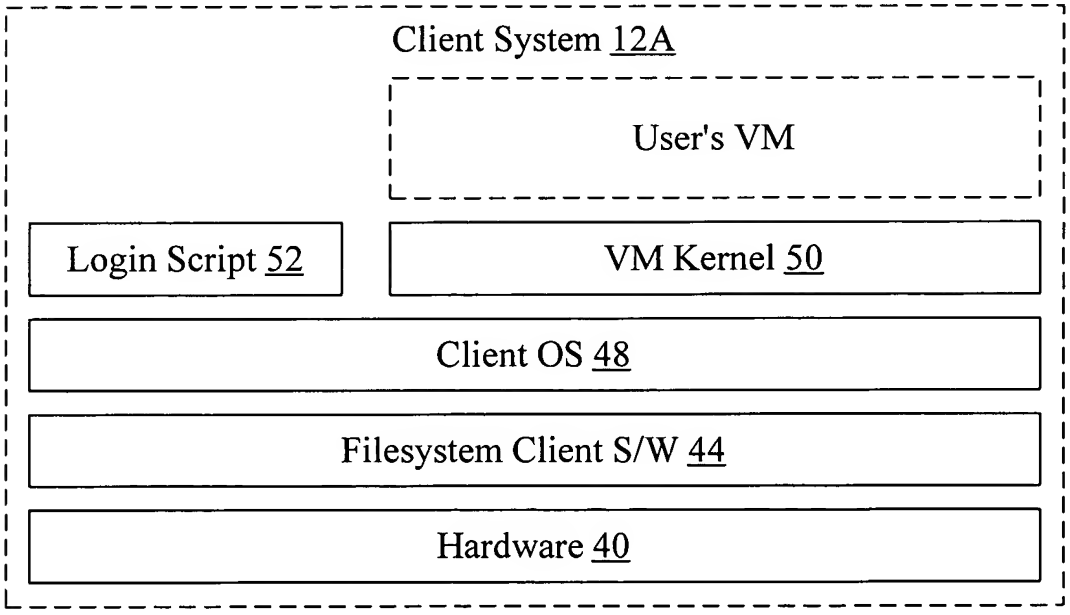
Client System 12A
User's VM
Login Script 52
VM Kernel 50
Client OS 48
Filesystem Client S/W 44
Hardware 40

Fig. 3

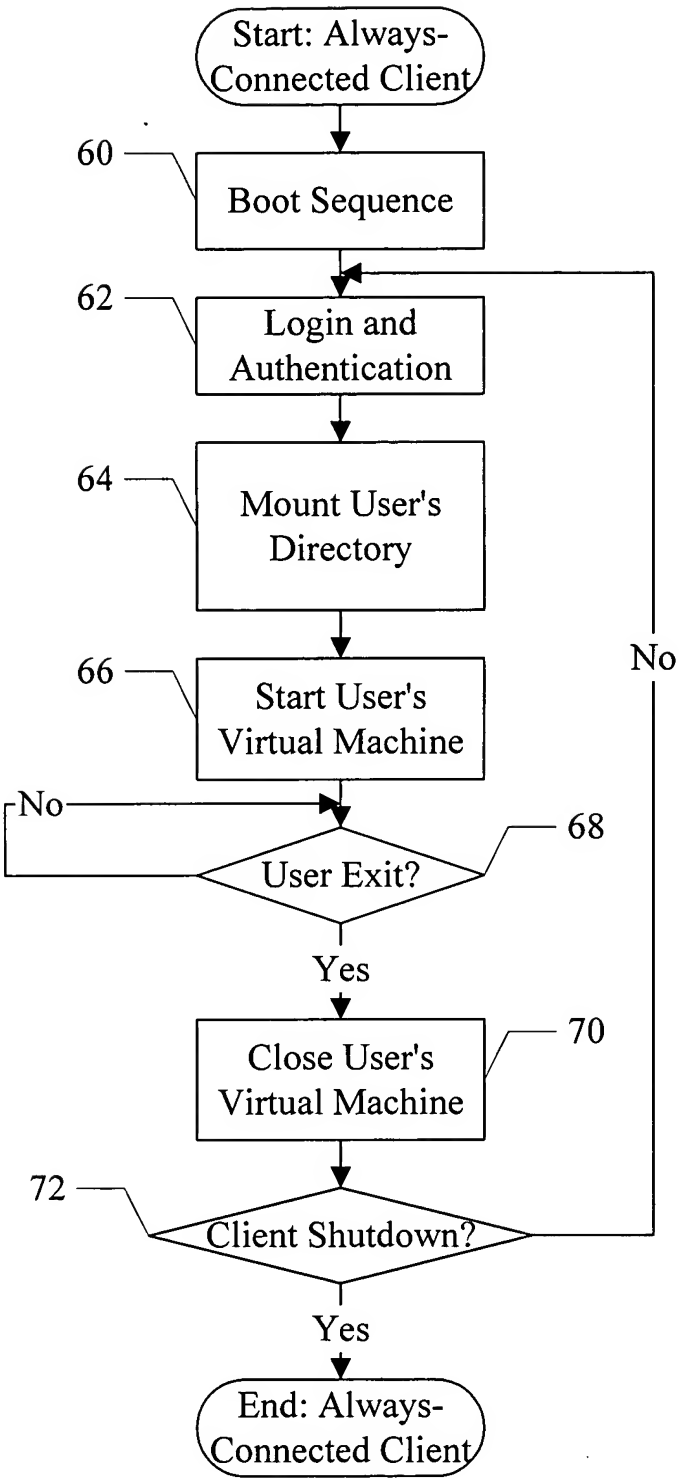
Start: Always-Connected Client
60
Boot Sequence
62
Login and Authentication
64
Mount User's Directory
66
Start User's Virtual Machine
No
68
User Exit?
Yes
70
Close User's Virtual Machine
72
Client Shutdown?
No
Yes
End: Always-Connected Client

Fig. 4

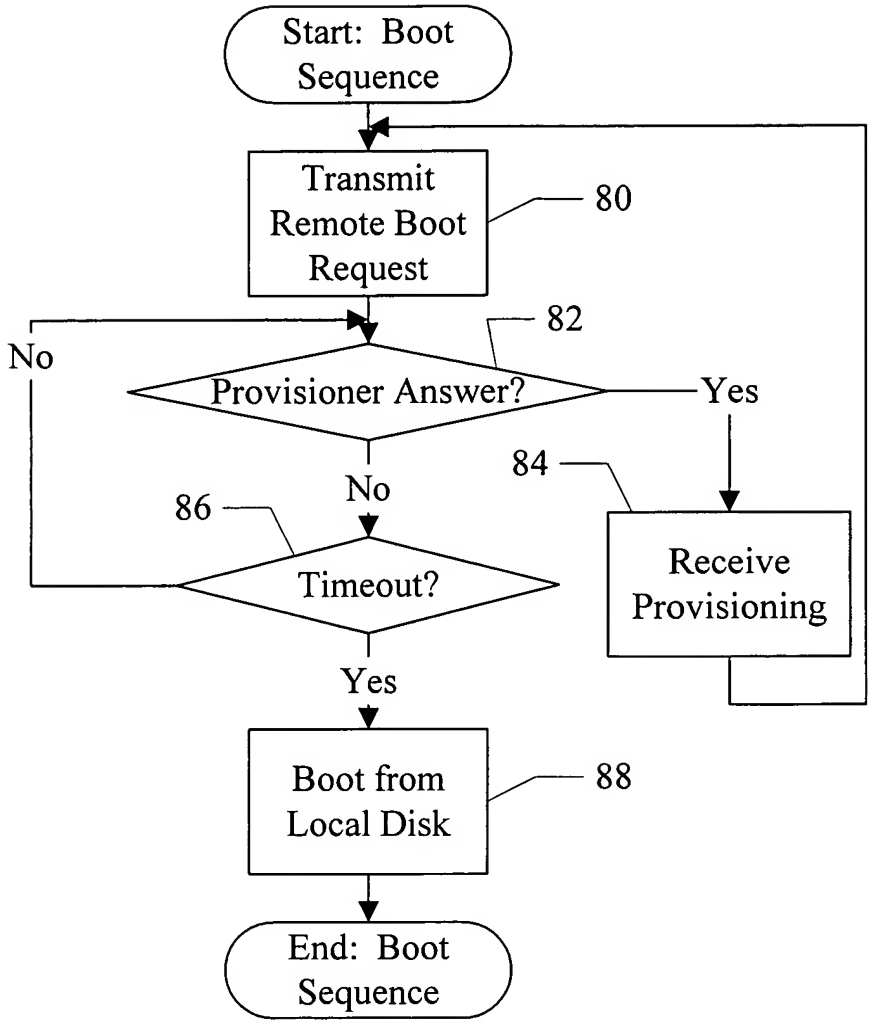
Start: Boot Sequence
Transmit Remote Boot Request
80
82
No
Provisioner Answer?
Yes
84
No
86
Timeout?
Receive Provisioning
Yes
Boot from Local Disk
88
End: Boot Sequence
60

Fig. 5

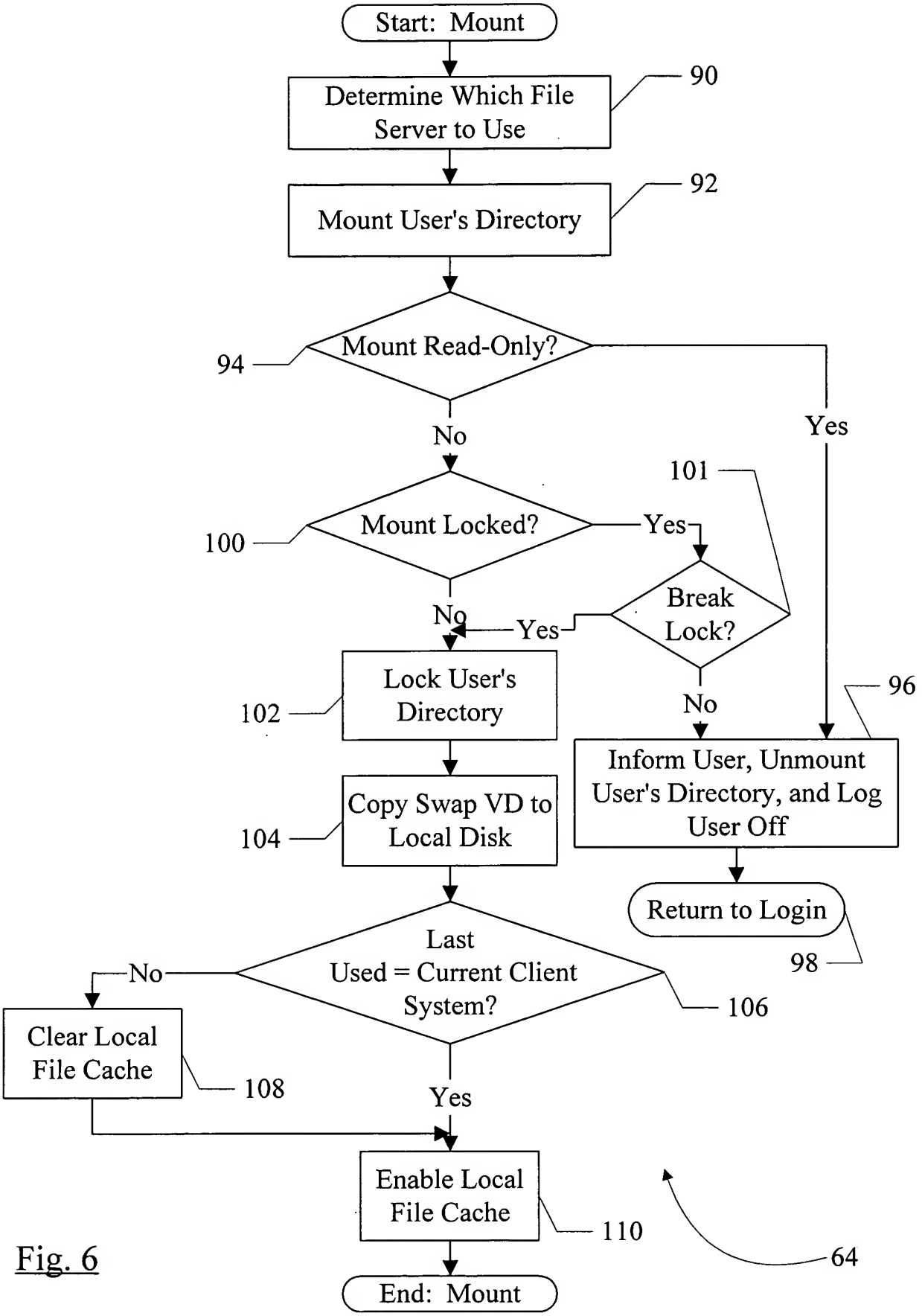
Start: Mount
Determine Which File Server to Use
90
Mount User's Directory
92
Mount Read-Only?
94
No
Yes
101
Mount Locked?
100
Yes
Break Lock?
No
Yes
Lock User's Directory
102
No
96
Inform User, Unmount User's Directory, and Log User Off
Copy Swap VD to Local Disk
104
Return to Login
98
Last Used = Current Client System?
No
106
Clear Local File Cache
108
Yes
Enable Local File Cache
110
64
End: Mount

Fig. 6

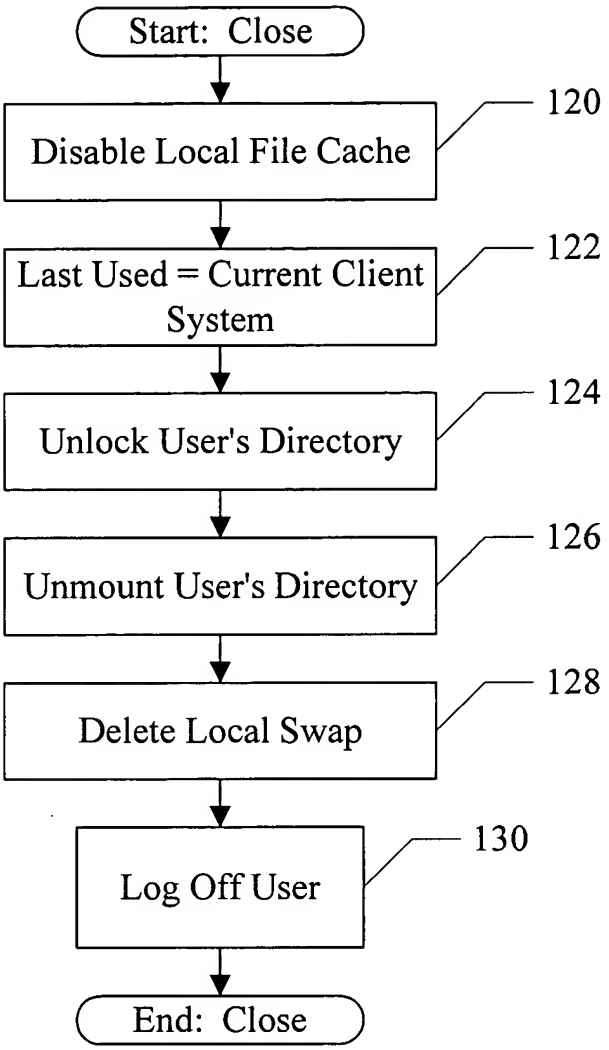
Start: Close
Disable Local File Cache
120
Last Used = Current Client System
122
Unlock User's Directory
124
Unmount User's Directory
126
Delete Local Swap
128
Log Off User
130
End: Close
70

Fig. 7

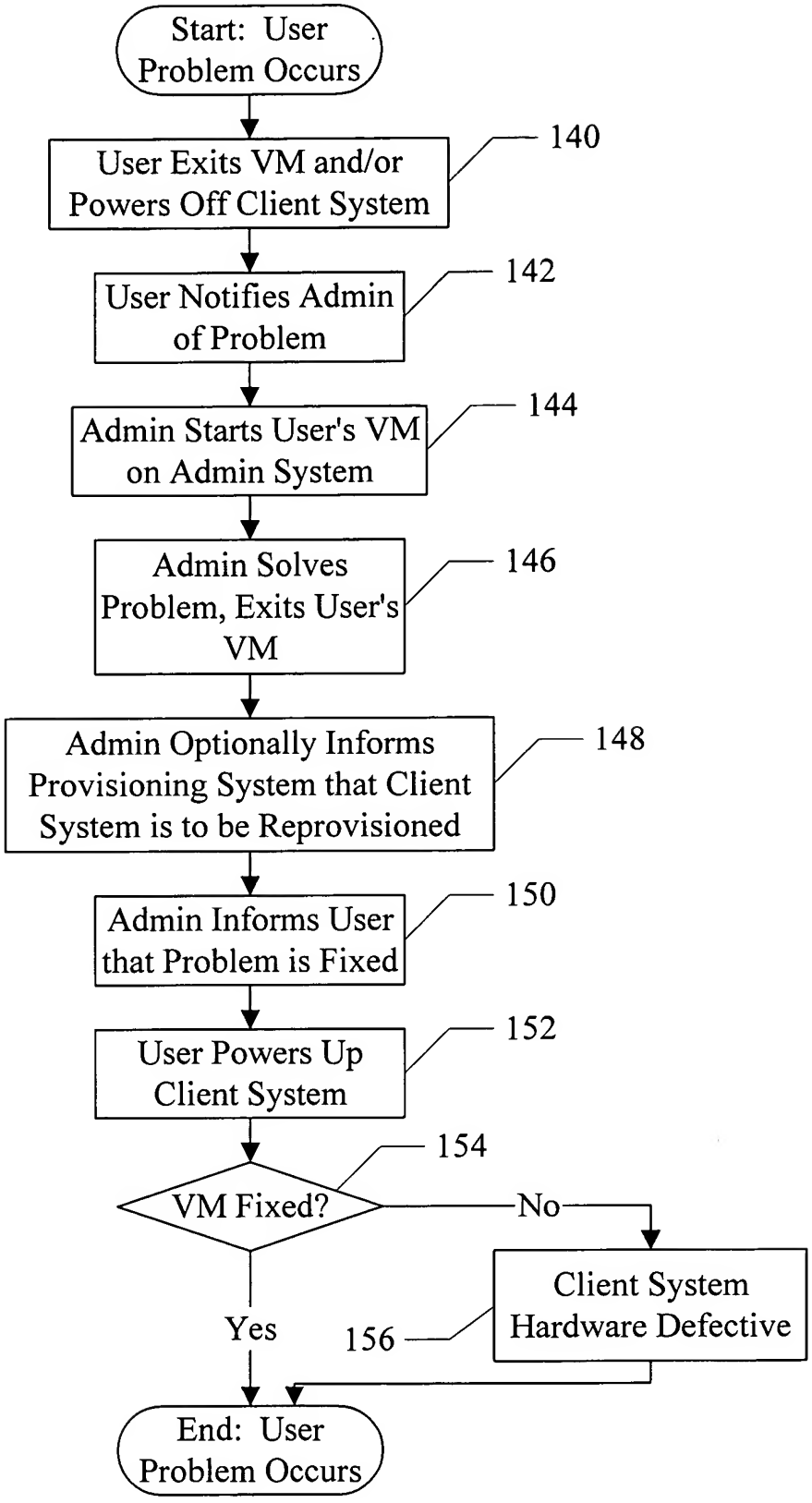
Start: User Problem Occurs
User Exits VM and/or Powers Off Client System
140
User Notifies Admin of Problem
142
Admin Starts User's VM on Admin System
144
Admin Solves Problem, Exits User's VM
146
Admin Optionally Informs Provisioning System that Client System is to be Reprovisioned
148
Admin Informs User that Problem is Fixed
150
User Powers Up Client System
152
VM Fixed?
154
No
Client System Hardware Defective
156
Yes
End: User Problem Occurs

Fig. 8

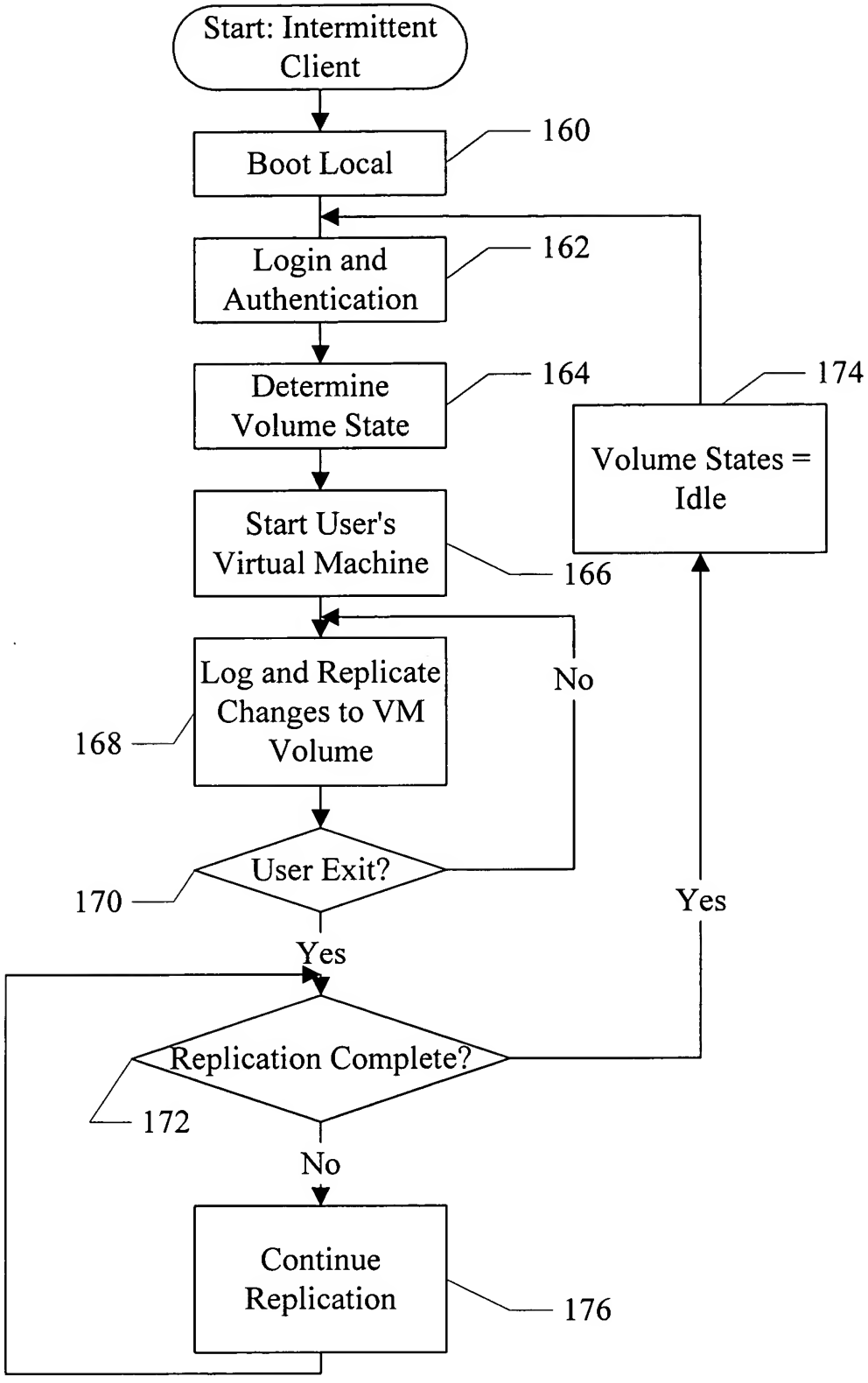
Start: Intermittent Client
Boot Local
160
Login and Authentication
162
Determine Volume State
164
Start User's Virtual Machine
166
Log and Replicate Changes to VM Volume
168
User Exit?
170
No
Yes
Replication Complete?
172
No
Yes
Continue Replication
176
Volume States = Idle
174

Fig. 9

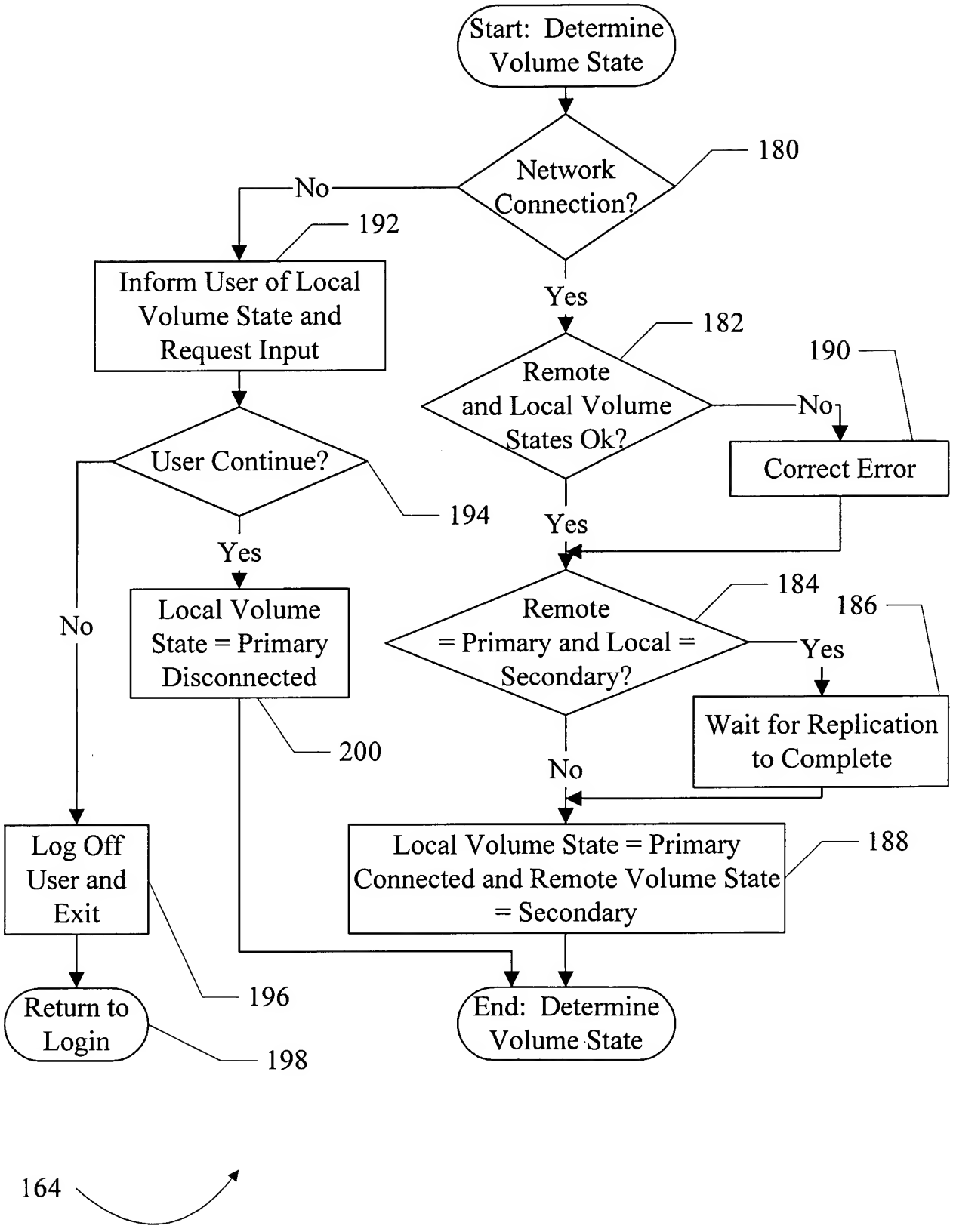
Start: Determine Volume State
Network Connection?
180
No
192
Inform User of Local Volume State and Request Input
Yes
182
Remote and Local Volume States Ok?
190
No
Correct Error
User Continue?
194
Yes
No
Yes
Local Volume State = Primary Disconnected
200
Remote = Primary and Local = Secondary?
184
186
Yes
Wait for Replication to Complete
No
Log Off User and Exit
Local Volume State = Primary Connected and Remote Volume State = Secondary
188
196
Return to Login
198
End: Determine Volume State
164

Fig. 10

Local Volume State	Remote Volume State	Action
Primary Connected	Secondary of Client System	Continue Replication
Primary Connected	Not Secondary of Client System	Error 1
Primary Disconnected	Idle	Remote = Secondary, Local = Primary, Replicate
Primary Disconnected	Not Idle	Error 2
Secondary	Primary of Client System	Continue Replication
Secondary	Not Primary of Client System	Error 3
Idle	Idle	Continue

Fig. 11

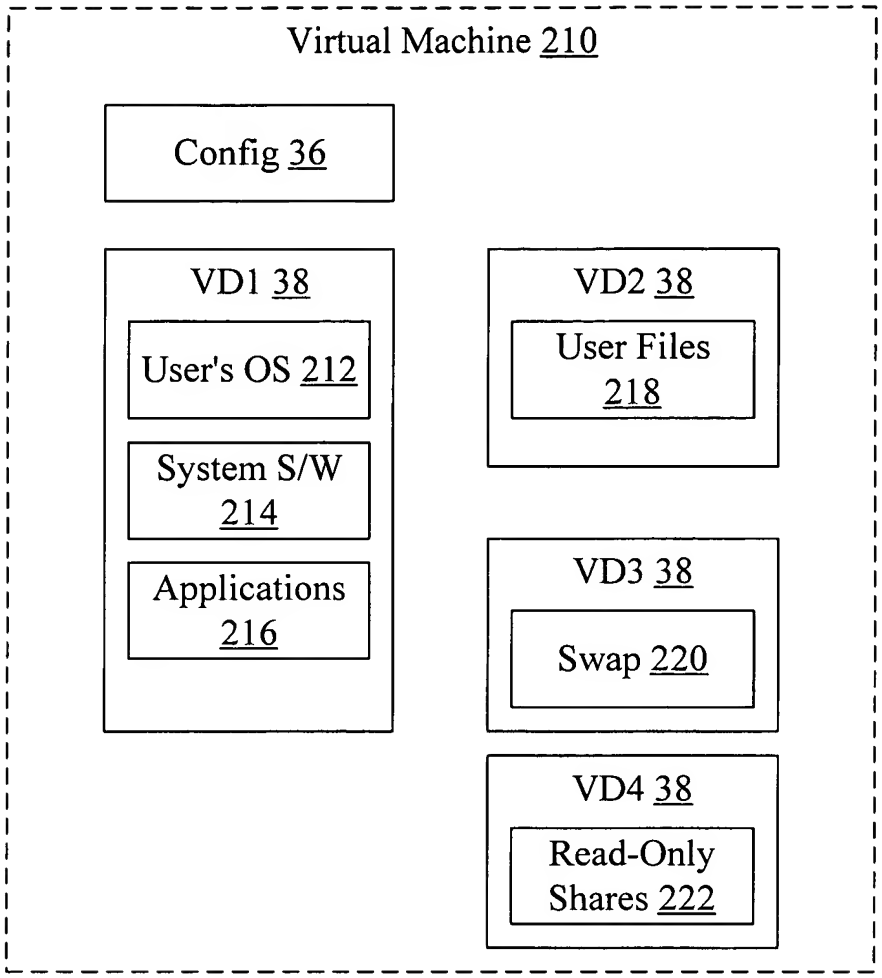
Virtual Machine 210
Config 36
VD1 38
User's OS 212
System S/W 214
Applications 216
VD2 38
User Files 218
VD3 38
Swap 220
VD4 38
Read-Only Shares 222

Fig. 12

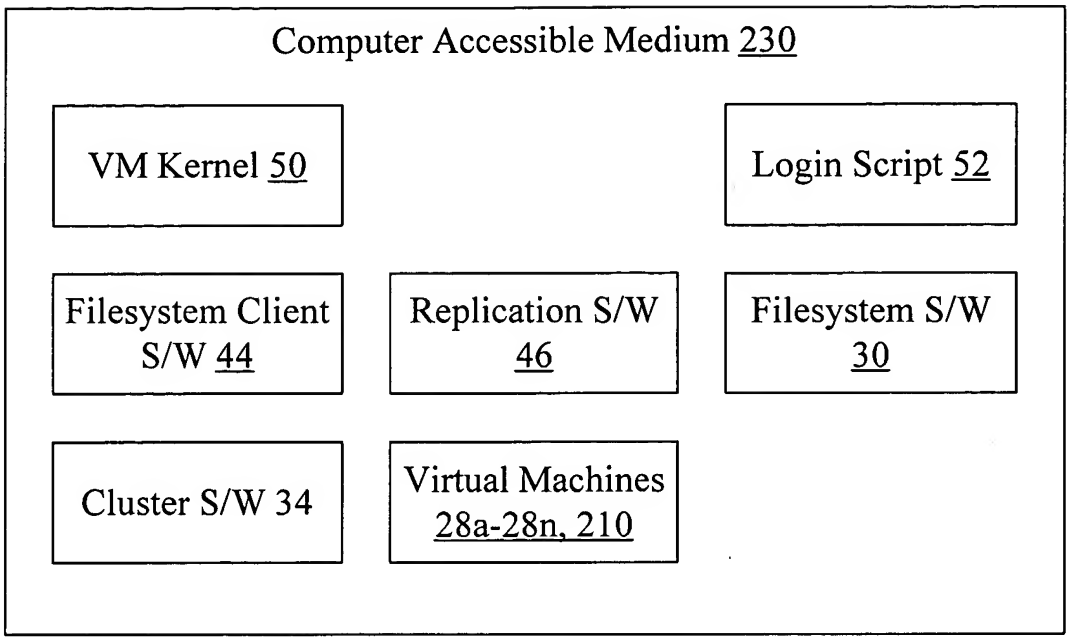
Computer Accessible Medium 230
VM Kernel 50
Login Script 52
Filesystem Client S/W 44
Replication S/W 46
Filesystem S/W 30
Cluster S/W 34
Virtual Machines 28a-28n, 210

Fig. 13